

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2004/001510

A. CLASSIFICATION OF SUBJECT MATTER IPC7: C12N 15/31, C07K 14/315, C12P 21/02, C12N 15/63, C07K 19/00, A61K 39/09, A61P 31/04, G01N 33/569, A61K 38/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC7: C12N 15/31, C07K 14/315, C12P 21/02, C12N 15/63, C07K 19/00, A61K 39/09, A61P 31/04, G01N 33/569, A61K 38/16

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
GeneSeq, Delphion, Pubmed, Canadian Patent Database. Keywords: Streptococcus, pyogenes, use

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No(s). |
|-----------|--|-----------------------------|
| X | BERES, SB ET AL. "Genome sequence of a serotype M3 strain of group A Streptococcus: Phage-encoded toxins, the high-virulence phenotype, and clone emergence" PROC. NAT. ACAD. SCI. USA. 99(15): 10078-10083. July 2002 also disclosed as GenBank accession Nos: AE014137 and AAM78661.1. | 1-15, 17-20 |
| Y | | 23, 25-29, 31-34, 36 and 37 |
| X | FERRETTI, JJ ET AL. "Complete genome sequence of an M1 strain of Streptococcus pyogenes" PROC. NAT. ACAD. SCI. USA. 98(8): 4658-4663. April 2001 also disclosed as Genbank accession Nos: AE006478 and AAK33197.1. | 1-15, 17-20 |
| Y | | 23, 25-29, 31-34, 36 and 37 |

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

| | |
|---|--|
| * Special categories of cited documents : | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention |
| "A" document defining the general state of the art which is not considered to be of particular relevance | "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone |
| "E" earlier application or patent but published on or after the international filing date | "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "&" document member of the same patent family |
| "O" document referring to an oral disclosure, use, exhibition or other means | |
| "P" document published prior to the international filing date but later than the priority date claimed | |

Date of the actual completion of the international search

05 April 2005 (05-04-2005)

Date of mailing of the international search report

21 April 2005 (21-04-2005)

Name and mailing address of the ISA/CA
Canadian Intellectual Property Office
Place du Portage I, C114 - 1st Floor, Box PCT
50 Victoria Street
Gatineau, Quebec K1A 0C9
Facsimile No.: 001(819)953-2476

Authorized officer

Robert Rymerson (819) 956-9972

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No(s). |
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| X | WO2002/34771 CHIRON S.P.A. (Telford J et al.) 02-05-2002 see SEQ ID NO: 6345 (nucleotide) and SEQ ID NO: 6346 (peptide) also disclosed as GeneSeq accession Nos: ABN69216 and ABP28585 | 1-20, 23, 25-29, 31-34 |
| Y | | 36, 37 |
| X | WANG. L ET. AL. "Prokaryotic essential gene #31933" GENESEQ DATABASE ACCESSION No: ACA50276 19-06-2003 (from WO2002/77183; SEQ ID NO: 38146) (ELITRA PHARM INC.) | 1-15 |
| X | WANG. L ET. AL. "Protein encoded by prokaryotic essential gene #31933" GENESEQ DATABASE ACCESSION No: ABU46406 19-06-2003 (from WO2002/77183; SEQ ID NO: 74330) (ELITRA PHARM INC.) | 17-20 |
| Y | | 23, 25-29, 31-34, 36, 37 |
| P,Y | US2004/0071729 A1 ADDERSON E AND BOHNSACK J 15-04-2004 see whole document | 23, 25-29, 31-34 |
| Y | CA2413576 A1 SHIRE BIOCHEM INC. (Martin D et al.) 17-01-2001 see pp. 15-23, and examples | 23, 25-29, 31-34 |
| Y | CA2438921 A1 SHIRE BIOCHEM INC. (Martin D et al.) 29-08-2002 see pp. 15, 18, 21, 23 and examples | 23, 25-29, 31-34 |
| Y | CA2432525 A1 SHIRE BIOCHEM INC. (Martin D et al.) 27-06-2002 see pp. 17, 18, 21, 23-25, and examples continued on extra sheet | 23, 25-29, 31-34 |

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Information on patent family members

International application No.
PCT/CA2004/001510

| Patent Document Cited in Search Report | Publication Date | Patent Family Member(s) | Publication Date |
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continued on Extra Sheet

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CONTINUATION OF BOX III:

Group I: Claims 1-37, all partially, are directed to polynucleotides corresponding to the SHB GAS 102 polypeptide from *Streptococcus pyogenes* and variants thereof (SEQ ID NOS: 1, 2, 21-28); vectors and host cells comprising said polynucleotides; the SHB GAS 102 polypeptide and variants thereof; chimeric polypeptides and pharmaceutical compositions comprising said polypeptide; a process for producing said polypeptide; methods for prophylactic or therapeutic treatment of *S. pyogenes* infection using said pharmaceutical compositions; methods of diagnosing *S. pyogenes* infections using said polypeptide; uses for said pharmaceutical compositions; and kits comprising said polypeptide.

Group II: Claims 1-37, all partially, are directed to polynucleotides corresponding to the SHB GAS 103 polypeptide from *Streptococcus pyogenes* and variants thereof (SEQ ID NOS: 3, 4, 29-36); vectors and host cells comprising said polynucleotides; the SHB GAS 103 polypeptide and variants thereof; chimeric polypeptides and pharmaceutical compositions comprising said polypeptide; a process for producing said polypeptide; methods for prophylactic or therapeutic treatment of *S. pyogenes* infection using said pharmaceutical compositions; methods of diagnosing *S. pyogenes* infections using said polypeptide; uses for said pharmaceutical compositions; and kits comprising said polypeptide.

Group III: Claims 1-37, all partially, are directed to polynucleotides corresponding to the SHB GAS 104 polypeptide from *Streptococcus pyogenes* and variants thereof (SEQ ID NOS: 5, 6, 37-44); vectors and host cells comprising said polynucleotides; the SHB GAS 104 polypeptide and variants thereof; chimeric polypeptides and pharmaceutical compositions comprising said polypeptide; a process for producing said polypeptide; methods for prophylactic or therapeutic treatment of *S. pyogenes* infection using said pharmaceutical compositions; methods of diagnosing *S. pyogenes* infections using said polypeptide; uses for said pharmaceutical compositions; and kits comprising said polypeptide.

The multiple inventions identified above are not linked so as to form a single inventive concept and consequently do not comply with Rule 13 of the PCT.

SHEET 2, BOX C, CONTINUED

- A CA2413450 A1
SHIRE BIOCHEM INC.
(Hamel J et al.)
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- A CA2356836 A1
SHIRE BIOCHEM INC.
(Martin D et al.)
06-07-2000
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FUSO PHARMACEUTICAL INDUSTRIES LTD
(Ueyama H et al.)
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Patent Family Annex continued

| Patent Document Cited in Search Report | Publication Date | Patent Family Member(s) | Publication Date |
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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of the first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons :

1. ☒ Claim Nos. : 25-31
because they relate to subject matter not required to be searched by this Authority, namely :

Although claims 25-31 are directed to methods of medical treatment of a human/animal body which the Authority is not required to search under Rule 39.1(iv) of the PCT, the search has been carried out based on the alleged effects of the compounds referred to therein.
2. ☐ Claim Nos. :
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically :
3. ☐ Claim Nos. :
because they are dependant claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows :

see extra sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claim Nos. :
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim Nos. :

claims 1-37, partially (Group I, see extra sheet)

Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.